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10/666,409	09/19/2003	Johan M. Gunther	5200	7452

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EXAMINER	
SALDANO, LISA M	

ART UNIT	PAPER NUMBER
3673	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/666,409	GUNTHER, JOHAN M.	
	Examiner	Art Unit	
	Lisa M. Saldano	3673	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 September 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to because the details in some figures seem to contradict the details in cross-sections provided for respective figures. For example, Fig.3 is a cross-section of Fig.2, but in Fig. 3, element 70 appears below an element 75, which is not shown in Fig.2. Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the injectors set in the vane at a radial distance from the shaft, as claimed in claim 6, must be shown or the feature(s) canceled from the claim(s). The applicant should also check that other claimed features appear clearly in the drawings. No new matter should be entered.

Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Oath/Declaration

3. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because: the document appears to have been copied multiple times and the text is not clear or legible.

Specification

4. The disclosure is objected to because of the following informalities: element numbers referred to in the specification are not shown in the drawings. For example, region 39 is not shown in the drawings, although it is discussed on page 20, lines 24.

Appropriate correction is required.

Claim Objections

5. Claim 27 is objected to because of the following informalities:

Regarding claim 27, the applicant appears to have mistakenly typed "id" instead of "is." Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-3, 6, 20, 22, 23, 25 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Gunther (5,967,700).

Regarding claims 1, 20 and 25, Gunther discloses lime/cement columnar stabilization of soils comprising vehicle 15 that supplies lime/cement and water to a mast structure 18. The disclosure provides a too for injecting a mixture of water, lime and cement (binder) for making an in-situ piling (see abstract). The structure of the tool supports a drive shaft 20 that carries a rotary auger bit 30 (see column 2,lines 46). The drive shaft is bi-directionally powered for rotation for downward movement into the soil and reverse upward movement. The auger bit comprises blades 32,33 that form vane-like outer walls are joined at tip 36 (see column 3, lines 40-45). The augur penetrates a soil formation to a predetermined depth; then as the auger is withdrawn, still rotating, lime and cement binders are mixed together with the soil (see column 2, lines 51-55).

Regarding claims 1 and 6, Gunther further discloses water passages 41 and water injecting orifices 43-48 on the vane-like walls of the auger bit (see column 3, lines 47-50 and Fig.2). Gunther discloses that as many orifices as desired may be used. Gunther further discloses

orifice 60 formed in the wall of the shaft for injecting a mixture of dry lime and cement to moistened soil whereby the binders are mixed in the soil by the blades of the auger bit (see Figs. 2 and 3). The axes of emission of the injecting orifices are directed away from the tool into a soil formation at a location along a central axis 21 (see Fig.2). The orifices are set at a radial distance from the shaft 20.

Gunther discloses that a suitable mixture of water, lime and cement are injected together with the soil and already present water to form a column of cementitious material like an in-situ piling. The water, lime and cement injection orifices are disposed and arranged such that their emissions will, as broadly claimed by the applicant, during a limited number of revolutions, encounter one another an be mixed. The mixture of water to binder material is predetermined based on the water content of the soil as determined from a previous boring test (see column 2, lines 39-45).

Regarding claims 2 and 26, Gunther discloses that the water, cement and lime orifices (43-48,60) of the invention as described above are substantially normal to central axis 29 (see Fig.2). Furthermore, Gunther discloses that the water, cement, lime and soil are mixed together by the auger, then the auger is rotated out the cylindrical column of mixed material which soon (a temporally suitable time) sets-up in a time related to curing of the binder (see column 2, lines 20-30).

Regarding claim 3, Gunther discloses the invention as described above wherein dry lime/cement orifice 60 is disposed about 180 degrees apart from water orifice 44 as viewed in lateral section (see Fig.2).

Regarding claim 10, Gunther discloses the invention as described above wherein a water control valve 52 controls the rate of water being added to the soil formation. Valve means 65 control pressure on the dry mixture of binding materials to determine how much and when they are injected into the soil formation (see column 3, line 66 –column 4, line 35).

Regarding claim 22, Gunther discloses the invention as described above wherein the mixture of lime and cement is injected into the soil and stirred as the auger rises (see column 4, lines 44-45).

Regarding claim 23, Gunther discloses the invention as described above wherein the injection of water is made during the passage of the auger into the soil formation (see column 4, lines 36-40).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 4, 5 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gunther as applied to claims 1, 2 and 6 above, in view of Yoshida et al (5,228,809).

Gunther discloses a tool as disclose above. Specifically, Gunther discloses that "as few or as many of the water injection orifices may be provided as the designer prefers (see column 3, lines 50-53). Gunther also discloses multiple orifices 60 formed in the wall of the shaft for injection of dry lime and cement. Gunther further discloses that the specification of water, soil, lime and cement is not intended to exclude other compounds and compositions that might be useful in the injection of components, their mixing and of the setting of the total mixture of components.

However, Gunther fails to disclose that the axis of emission of the water and dry lime and cement intersect adjacent to the shaft of the invention. Gunther fails to disclose that the water injectors are located axially between the binder injectors. Gunther also fails to disclose that the binder injectors are located axially between the water injectors.

Yoshida et al disclose a ground improving injecting apparatus 110 comprising a pipe shaft 116 that is rotatably supported by a supporting apparatus 119 and is vertically moveable by crane 120. Yoshida et al disclose that the pipe is used for injecting high-pressure water, compressed air and cement milk (a binder) to form an underground columnar consolidation body, such as an in-situ piling (see column 6, lines 10-12 and column 7, lines 19-25). The invention comprises a plurality of nozzles 111a-111e for water injection and an injection liquid nozzle 121 for injection liquid such as cement milk (see Figs.5-7 and column 6, lines 35-55). Fig.7 illustrates that the injection stream J of the high pressured water and the angled stream path for injection liquid nozzle 121, which is outwardly flared in the direction of stream J are arranged such that their emissions will intersect producing a mixture of water and binder (cement milk) with a velocity and radial component.

Regarding claim 8, Yoshida et al disclose that the injection liquid nozzle 121 is located axially between water injectors 111a-111e. Yoshida et al disclose that the location of the injection nozzles relative to the injection liquid nozzles helps to reach fluid flows of a theoretical nature, thereby producing more predictable behavior of the injected compositions.

It would have been obvious to one of ordinary skill to modify the invention of Gunther to incorporate additional water injection orifices, as suggested by Gunther, such that those additional water orifices could be arranged to have axes of emissions intersecting with a binder injection orifices' axis of emission, as taught by Yoshida et al. Furthermore, Gunther clearly states that the invention is for use with not just dry lime and cement, but also other compounds and compositions that might be useful in the injection of components, their mixing and of the setting of the total mixture of components. Yoshida et al teach the use of cement milk as a composition that binds and ultimately forms an in-situ piling. The combination of Gunther's vane blade structure comprising injection orifices with Yoshida et al's intersecting axes of water and injection liquid orifices ensures that the binding component is provided with sufficient fluid to mix the various components together in-situ in the soil formation and provide a properly formed piling.

Regarding claims 8 and 9, it would have been obvious to one of ordinary skill to modify the invention of Gunther to incorporate either binder injectors located axially between water injectors or water injectors axially between binder injectors, because, firstly, Gunther discloses the use of multiple water and binder injectors. Yoshida et al disclose that placement of a plurality of injectors with another injector located axially therebetween results in more predictable fluid

flow, which is generally desirable in the formation of structural components such as in-situ pilings.

10. Claims 10-14, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gunther as applied to claim 1 and 20 above, in view of Hocking (5,944,446).

Regarding claims 10, 11 and 14, Gunther discloses the invention as described above wherein he discloses that the valves may be programmed to supply the correct amount of water for each depth (see column 4, lines 1-5). To review, Gunther discloses a water control valve 52 that controls the rate of water being added to the soil formation. Valve means 65 control pressure on the dry mixture of binding materials to determine how much and when they are injected into the soil formation (see column 3, line 66 –column 4, line 35).

Regarding claims 12 and 27, Gunther discloses the invention as described above wherein the water content of the soil at various depths will have been learned from a previous test boring (see column 2, lines 39-42).

However, Gunther fails to disclose that the rates of binder may also be controlled by program. Gunther also fail to disclose the use of devices to sense water conditions at depth below the surface.

Regarding claim 28, Hocking discloses an apparatus for the injection of mixtures into subterranean formations comprising injection outlet ports 2 with radial isolation vanes 3 and flexible diaphragms 4 for independent control of injection pressures and flow rates in different directions. Hocking further discloses control valves 11, a computer providing feedback control

10 and pumping system 5. Injection pressures and flow rates are interactively modified and thereby modify a mixture composition according to calculation and responses from detection devices (see abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the valve means of Gunther to incorporate programmable control, as taught by Hocking because Gunther clearly acknowledges that benefit of programmable controls for valve operation. Hocking's teaching further enhances the Gunther invention by providing programmable valve control for the ground improving injection fluid mixture, for more automation and convenience within the system.

Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention modify the disclose of Gunther to incorporate detection devices, as taught by Hocking, because Gunther clearly acknowledges that benefit of soil testing at various depths, as disclosed above. Provision of devices to further detect and sense conditions below the surface are another method of determining water conditions for more accurately determining the binder/water ratio of the resulting binder composition to figure out and project the ultimate physical properties of the modified earthen mixture.

11. Claims 15- 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gunther in view of Hocking, as applied to claim 10, in further view of Yoshida et al (5,228,809).

Gunther and Hocking disclose inventions as described above. Specifically, Gunther discloses that "as few or as many of the water injection orifices may be provided as the designer

prefers (see column 3, lines 50-53). Gunther also discloses multiple orifices 60 formed in the wall of the shaft for injection of dry lime and cement. Gunther further discloses that the specification of water, soil, lime and cement is not intended to exclude other compounds and compositions that might be useful in the injection of components, their mixing and of the setting of the total mixture of components.

Regarding claim 17, Gunther discloses that the axes of emission of the injecting orifices are directed away from the tool into a soil formation at a location along a central axis 21 (see Fig.2). The orifices are set at a radial distance from the shaft 20.

However, Gunther fails to disclose that the axis of emission of the water and dry lime and cement intersect adjacent to the shaft of the invention. Gunther fails to disclose that the water injectors are located axially between the binder injectors. Gunther also fails to disclose that the binder injectors are located axially between the water injectors.

Yoshida et al disclose a ground improving injecting apparatus 110 comprising a pipe shaft 116 that is rotatably supported by a supporting apparatus 119 and is vertically moveable by crane 120. Yoshida et al disclose that the pipe is used for injecting high-pressure water, compressed air and cement milk (a binder) to form an underground columnar consolidation body, such as an in-situ piling (see column 6, lines 10-12 and column 7, lines 19-25). The invention comprises a plurality of nozzles 111a-111e for water injection and an injection liquid nozzle 121 for injection liquid such as cement milk (see Figs.5-7 and column 6, lines 35-55). Fig.7 illustrates that the injection stream J of the high pressured water and the angled stream path for injection liquid nozzle 121, which is outwardly flared in the direction of stream J are

arranged such that their emissions will intersect producing a mixture of water and binder (cement milk) with a velocity and radial component.

Regarding claim 16, Yoshida et al disclose that the injection liquid nozzle 121 is located axially between water injectors 111a-111e. Yoshida et al disclose that the location of the injection nozzles relative to the injection liquid nozzles helps to reach fluid flows of a theoretical nature, thereby producing more predictable behavior of the injected compositions.

It would have been obvious to one of ordinary skill to modify the invention of Gunther to incorporate additional water injection orifices, as suggested by Gunther, such that those additional water orifices could be arranged to have axes of emissions intersecting with a binder injection orifices' axis of emission, as taught by Yoshida et al. Furthermore, Gunther clearly states that the invention is for use with not just dry lime and cement, but also other compounds and compositions that might be useful in the injection of components, their mixing and of the setting of the total mixture of components. Yoshida et al teach the use of cement milk as a composition that binds and ultimately forms an in-situ piling. The combination of Gunther's vane blade structure comprising injection orifices with Yoshida et al's intersecting axes of water and injection liquid orifices ensures that the binding component is provided with sufficient fluid to mix the various components together in-situ in the soil formation and provide a properly formed piling.

Regarding claims 8 and 9, it would have been obvious to one of ordinary skill to modify the invention of Gunther to incorporate either binder injectors located axially between water injectors or water injectors axially between binder injectors, because, firstly, Gunther discloses the use of multiple water and binder injectors. Yoshida et al disclose that placement of a plurality

of injectors with another injector located axially therebetween results in more predictable fluid flow, which is generally desirable in the formation of structural components such as in-situ pilings.

12. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gunther as applied to claim 1 above.

Gunther discloses the invention as described above. Specifically, Gunther discloses rods 34,35 (see Fig. 2) wherein baffles are formed at the outermost edges of rods 34,35. These rods form a baffle on the vane-like arms that confine emissions from injector orifices 60.

Although Gunther fails to explicitly disclose that a baffle may be used to confine the emissions of the water injectors, his disclosure and illustrations clearly convey the use of baffles to contain and confine emissions to a region encountered by the vane-like arms. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a baffle to contain the emissions of some water injectors as well, because doing so further assists the designer to determine the water content of the soil in the earthen formation closest to the drive shaft and vane-like arms.

13. Claims 21 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gunther as applied to claim 20 above.

Gunther discloses the invention as described above. Specifically, Gunther clearly discloses that the invention is not intended to exclude other compounds and compositions that might be useful in the injection of components, their mixing and of the setting of the total

mixture of components. Therefore, the invention is generally for use in the delivery of ground improving material to soil formations. Gunther furthermore discloses the use of water and binder material valves to allow the use manual or programmable control of the water and/or binder materials to soil in an earthen formation.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the explicitly disclosed procedures of Gunther to incorporate a method wherein binder material is injected during passage of the tool into the formation and/or wherein water is injected during passage of the tool out the soil formation because the designer could very likely select a composition of binding materials such that proper mixing and setting of the components requires that particular sequence of events.

14. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gunther as applied to claim 20 above in further view of Blum (5,542,786).

Gunther discloses the invention as described above. Gunther discloses that the binder injections are performed at pneumatic pressures of about 4,000 psi.

However, Gunther fails to disclose a pressure of a stream of water and of the binder that is above ambient pressure.

Blum discloses an apparatus for monitoring grout pressure during construction of auger pressure grouted piling. Blum discloses that proper placement of grout within a pile requires that the pressure at the pump of a binding material far exceeds the pressure at the lower end of the auger (see column 1, lines 55-60).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Gunther to make sure that the stream of water and of binder in the tool is above the ambient pressure in a soil formation, as taught by Blum, because that pressure differential is required to ensure that the injected material arrive at their intended final destinations.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. England (6,116,819), Harsch (6,238,142), Staggs (4,461,362), Suzuki (4,940,366), Sugimoto et al (4,286,900), Yamada (JP-58127828-A), Tsuchihiro et al (JP-02209519-A) and Kodama et al (JP-57108313-A) disclose features that are pertinent to the present application.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lisa M. Saldano whose telephone number is 703-605-1167. The examiner can normally be reached on Monday-Friday, 8:30am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Heather C. Shackelford can be reached on 703-308-2978. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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